

1 Patent claims

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3 1. A method for measuring a voltage at a point in a power
4 distribution network by means of a measuring circuit (MS),
5 which has a voltage sensor (SG), which is coupled to a
6 current-carrying conductor (1) of the network, and a
7 further-processing arrangement (WA), which is connected to
8 the voltage sensor (SG), and outputs a measured voltage
9 value as the output signal at its output, the output signal
10 from the measuring circuit (MS) being corrected so as to
11 achieve a correct measured value by means of a correction
12 element (KG) having a transfer function which is inverse to
13 the transfer function of the measuring circuit (MS), and an
14 electronic filter being used as the correction element (KG),
15 it being possible for the transfer function of said
16 electronic filter to be adjusted so as to match it to the
17 respective transfer function of the measuring circuit (MS).

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19 2. The method as claimed in claim 1,
20 characterized in that
21 a capacitor device is used as the voltage sensor (SG) of the
22 measuring circuit (MS).

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24 3. The method as claimed in claim 2,
25 characterized in that
26 a coupling capacitor (2), formed from the current-carrying
27 conductor (1) of the network and an electrode which is
28 DC-isolated from said current-carrying conductor (1), is
29 used as the capacitor device.

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31 4. The method as claimed in claim 1,
32 characterized in that
33 an inductive voltage transformer (4), which is connected on
34 the primary side to the current-carrying conductor (1), is
35 used as the voltage sensor (SG).

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37 5. The method as claimed in claim 4,
38 characterized in that

1 a correction element (KG) is used which can optionally be
2 bypassed via a switch (11).

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4 6. The method as claimed in one of the preceding claims,
5 characterized in that,
6 in the case of an analog output signal from the measuring
7 circuit (MS), the correction is carried out by means of an
8 analog filter having a PID characteristic as the correction
9 element (KG).

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11 7. The method as claimed in one of claims 1 to 5,
12 characterized in that,
13 in the case of a digital output signal from the measuring
14 circuit (MS), the correction is carried out by means of a
15 digital filter (10) as the correction element (KG).

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17 8. The method as claimed in claim 7,
18 characterized in that
19 a digital filter (10) is used, with which the inverse
20 transfer function is represented by a temporally discrete
21 transfer function.

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23 9. The method as claimed in claim 8,
24 characterized in that
25 a digital filter (10) is used, with which the coefficients
26 of the temporally discrete transfer function can be altered.

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28 10. The method as claimed in one of the preceding claims,
29 characterized in that
30 a further-processing arrangement (WA) is used which has a DC
31 isolating element in its input region.

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33 11. A measuring apparatus (MV) for measuring a voltage at a
34 point in a power distribution network by means of a
35 measuring circuit (MS), which has a voltage sensor (SG),
36 which is coupled to a current-carrying conductor (1) of the
37 network, and a further-processing arrangement (WA), which is
38 connected to the voltage sensor (SG), and outputs a measured

1 voltage value as the output signal at its output, an
2 electronic filter as the correction element (KG) being
3 connected to the measuring circuit (MS) on the output side
4 so as to achieve a correct measured value from the output
5 signal from the measuring circuit (MS), said correction
6 element (KG) having a transfer function which is inverse to
7 the transfer function of the measuring circuit (MS), and it
8 being possible for the transfer function of the correction
9 element (KG) to be adjusted so as to match it to the
10 respective transfer function of the measuring circuit (MS).

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12 12. The measuring apparatus (MV) as claimed in claim 11,
13 characterized in that
14 the voltage sensor (SG) is a capacitor device.

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16 13. The measuring apparatus (MV) as claimed in claim 12,
17 characterized in that
18 the capacitor device is a coupling capacitor (2) formed from
19 the current-carrying conductor (1) of the network and an
20 electrode which is DC-isolated from said current-carrying
21 conductor (1).

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23 14. The measuring apparatus (MV) as claimed in claim 13,
24 characterized in that
25 the electrode of the coupling capacitor (2) is a ring
26 electrode surrounding the current-carrying conductor (1).

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28 15. The measuring apparatus (MV) as claimed in claim 11,
29 characterized in that
30 the voltage sensor (SG) is an inductive voltage transformer
31 (4), which is connected on the primary side to the
32 current-carrying conductor (1).

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34 16. The measuring apparatus (MV) as claimed in claim 15,
35 characterized in that
36 the correction element (KG) can optionally be bypassed via a
37 switch (11).

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1 17. The measuring apparatus (MV) as claimed in one of
2 claims 11 to 16,
3 characterized in that,
4 in the case of an analog output signal from the measuring
5 circuit (MS), the correction element (KG) is an analog
6 filter having a PID characteristic.

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8 18. The measuring apparatus (MV) as claimed in one of
9 claims 11 to 16,
10 characterized in that,
11 in the case of a digital output signal from the measuring
12 circuit (MS), the correction element (KG) is a digital
13 filter (10).

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15 19. The measuring apparatus (MV) as claimed in claim 18,
16 characterized in that
17 the transfer function of the digital filter (10) is
18 represented by a temporally discrete transfer function.

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20 20. The measuring apparatus (MV) as claimed in claim 19,
21 characterized in that
22 the digital filter (10) has a temporally discrete transfer
23 function having variable coefficients.

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25 21. The measuring apparatus (MV) as claimed in one of
26 claims 11 to 20,
27 characterized in that
28 the further-processing arrangement (WA) has a DC isolating
29 element in its input region.

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31 22. The measuring apparatus (MV) as claimed in claim 21,
32 characterized in that
33 the DC isolating element is an inductive current transformer
34 (6).

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36 23. The measuring apparatus (MV) as claimed in claim 22,
37 characterized in that

1 the voltage sensor (SG) is connected on the output side to a
2 series circuit comprising a resistor (5) having a high
3 resistance value and the primary winding of the inductive
4 current transformer (6).

5

6 24. The measuring apparatus (MV) as claimed in either of
7 claims 22 and 23,
8 characterized in that
9 the secondary winding of the current transformer (6) is
10 loaded by a negative feedback operational amplifier (7) with
11 an internal resistance of 0 ohm.

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13 25. The measuring apparatus (MV) as claimed in one of
14 claims 11 to 16 and 18 to 24,
15 characterized in that
16 the measuring circuit (MS) has an analog-to-digital
17 converter (9) on the output side.

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